

### REMARKS

Claims 35-43 are pending in the present application. In the Office Action dated February 24, 2004, the Examiner rejected claims 35-43 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner further rejected claims 35, 38 and 39 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,727,989 to Ohno et al. ("Ohno") in view of U.S. Patent No. 5,915,860 to Laurent ("Laurent"). The Examiner further rejected claims 36 and 37 under 35 U.S.C. § 103(a) as being unpatentable over the Ohno and Laurent references, as applied to claim 35 above, and further in view of U.S. Patent No. 6,135,859, to Tietz ("Tietz"). Additionally, the Examiner rejected claims 40 and 43 under 35 U.S.C. § 103(a) as being unpatentable over the Ohno reference in view of U.S. Patent No. 5,865,545, to Kondo ("Kondo"). Finally, claims 41 and 42 were rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Ohno in view of Kondo, as applied to claim 40 above, and further in view of Tietz.

Applicant disagrees with these grounds of rejection and wishes to clarify various distinctions of the embodiments of the applicant's disclosed invention over the cited art. Reconsideration is therefore requested in light of the present amendment and following remarks.

The disclosed embodiments will now be discussed in comparison to the prior art. It is understood, however, that the following discussion of the disclosed embodiments, as well as the discussion of the differences between the disclosed embodiments and the prior art subject matter do not define the scope or interpretation of any of the claims. Instead, such discussed differences are offered merely to help the Examiner appreciate important claim distinctions as they are discussed.

#### **Applicant's Disclosure v. The Cited Art**

Applicant discloses numerous embodiments of chemical mechanical planarization (CMP) machines configured to solve problems and provide economies of design, particularly for use in the field semiconductor planarization. Semiconductor CMP apparatus must polish semiconductor substrates to high level tolerances using abrasive particles suspended within the lattice of a polishing pad, or within a liquid slurry that is used with a smooth polishing pad. Because of the high tolerances and high through put demanded for reliability and economy in the

semiconductor industry, CMP, apparatus must be designed to produce a minimum level of contaminating particles, which ruin the semiconductor wafer being polished, must pull the polishing pad taut against, and planar to, a platen with high level of precision, and must be adaptable for long use and easy replacement of parts.

Applicant has solved these problems in many embodiments, one of which includes a cartridge assembly, whereby a supply role and a take-up role for the polishing pad are interconnected at a precisely defined distance from one another by a linear member disposed between the supply role and the take-up roll. Such an assembly provides for precise positioning of the polishing pad over the platen by merely engaging spline within the axels of the supply and take-up rolls with spindles correspondingly separated by the same distance as the distance between the roles. The same design also provides for rapid interchangeability of exhausted polishing pads with new polishing pads, merely by disengaging the cartridge with a spent polishing pad and replacing it with a cartridge with a new polishing pad. The cited art does not teach or suggest such an interchangeable cartridge design for use in CMP processes.

**Ohno** was cited for teaching a polishing pad cartridge in an apparatus having a supply and take-up spindles. Applicant disagrees with this characterization and the citation of Ohno in this regard. First, Ohno is directed to an apparatus for proving a workpiece with a *convex* tip. Applicant's embodiments, in contrast, are "for installation on a planarizing machine." The purposes and requirements for making something convex are almost exactly the opposite of making something planar. Clearly, the design of Ohno is not intended for application to a planarizing machine. Second, Ohno does not describe a *cartridge*. Figures 3 and 7, cited by the Examiner do not disclose a cartridge assembly at all, but rather merely show take-up and supply rolls connected (somehow) to a an apparatus for making a convex tip, which has a "hand drum-like configuration, i.e., a concave top and a concave bottom." (Col 6. line 46 ff.). Nowhere does Ohno disclose that the rolls are mounted in a *cartridge assembly*. Indeed, the word "cartridge" is not found anywhere in the text of Ohno. The Examiner also acknowledged that Ohno does not disclose a linear member between the attachment portions (for the supply and take up rolls).

**Laurent** was cited for disclosing a cartridge frame comprising a linear member between the supply rolls. Applicant traverses the use of Laurent in this respect. Laurent is directed to a cartridge for use with printer ink ribbons. Laurent does not disclose or suggest that

the ribbon could or should be a polishing pad for a CMP machine. Therefore, there is nothing in Laurent that teaches or suggests that the apparatus should, or could be used for the high tolerance demands of CMP machines. The cartridge shown by Laurent for printer ink ribbons in Figures 8 and 9 has two end plates, into which the rolls 84 are fit.. Laurent does not disclose that the supply and take up roles have *spindles separated by a first distance* or that the end plates have a *first attachment portion and a second attachment portion* or that the length to the endplate is the same as a distance between spindles. Basically, all that Laurent discloses is an endplate with holes at the ends, into which the rolls are fit. In contrast, in Figure 7, Applicant discloses a linear member (a support bar) with ends disposed between two spindles.. The ribbon up-take configuration of Laurent is no more similar to Applicant's embodiments, than is a video cassette, which like Laurent, has end plates for receiving the take-up and supply rolls of a tape.

**Tietz** was cited for disclosing a fixed abrasive polishing pad that include a suspension medium and plurality of abrasive elements attached thereto. Applicant admits that Tietz discloses such a polishing pad. In this respect, Tietz does not disclose anything more than Applicant has already admitted to in the Background section of the present application (see discussion of Figures 1-3). Of course, fixed abrasive polishing pads were known in the art. Applicant's disclosure is directed to use of a cartridge, and particularly adjustable tension cartridges that can be used specifically in combination with non-abrasive or fixed abrasive polishing pads that are used specifically for CMP of micro electronic substrates.

**Kondo**, like Laurent, is directed to ribbon cartridges for a printer. Like Laurent, the ink cartridge has end plates, except with depressions instead of holes, for receiving the supply and take-up rollers. Kondo was said to disclose that the cartridge has a supply roll that is movable relative to the take-up roll. Applicant disagrees with this characterization. Clearly the rotational axis of the rolls in the printer ribbon cartridge of Kondo are fixed relative to one another. In Applicant's embodiment, the entire supply roll or take up roll is moveable with respect to one another to provide adjustable tension and positioning across the platen as the polishing pad is rolled up. To accomplish this, the rolls adjustable in *position* with respect to one another so that the rotational axis of the rolls move relative to one another. Kondo does not teach such adjustable positioning, and indeed, the fixed endplates 17 in the cartridge of Kondo are not able to adjust the position of the two rolls relative to one another.

## The Claims and The Rejections Thereof

### Rejections over the Cited Art

Turning now to the claims and the rejections thereof, claims 35, 38 and 39 were rejected as obvious over Ohno in view of Luarent; claims 36 and 37 were rejected as obvious over the Ohno and Laurent in view of Tietz; claims 40 and 43 were rejected as obvious over Ohno in view of Kondo; and claims 41 and 42 were rejected as obvious over Ohno in view of Kondo, in view of Tietz. Applicant traverses these grounds of rejection and respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness on several grounds, and/or that the present remarks overcome the same.

First, the cited art in combination fails to disclose all the elements of Applicant's claimed invention. Independent Claims 35 recites, in pertinent part:

*A polishing pad cartridge for installation on a planarizing machine having a supply spindle and a take-up spindle spaced apart from the supply spindle by a first distance, the cartridge comprising:*

*a cartridge frame comprising a linear member having a first attachment portion and a second attachment portion spaced apart from the first attachment portion by a second distance, the second distance being approximately equal to the first distance between the supply spindle and the take-up spindle;*

*a supply roll rotatably coupled to the frame at the first attachment portion;*

*a take-up roll rotatably coupled to the frame at the second attachment portion; and an elongated polishing pad having a first end attached to the supply roll and a second end attached to the take-up roll.*

Independent Claim 40 recites, in pertinent part:

*A polishing pad cartridge for installation on a planarizing machine having a supply spindle and a take-up spindle spaced apart from the supply spindle by a first distance, the cartridge comprising:*

*a supply roll having a first aperture for receiving the supply roll spindle;*

*a take-up roll having a second aperture for receiving the take-up roll spindle;*

*an elongated member coupling the supply roll and the take-up roll; and*

an elongated polishing pad having a first end attached to the supply roll and a second end attached to the take-up roll, the elongated polishing pad being at least partially coiled on the supply roll, *the take-up roll being movable relative to the supply roll to separate the first and second apertures by a second distance approximately equal to the first distance* while the polishing pad is attached to the supply roll and the take-up roll.

The italicized text emphasizes the differences between the prior art and the claimed invention. First, Ohno does not disclose *a polishing pad cartridge for installation on a planarizing machine*. Ohno as discussed above does not, in fact, disclose a cartridge at all. Second, Ohno does not disclose a cartridge for installation on a planarizing machine. Ohno is directed to a machine for forming convex surfaces. Third, Ohno does not disclose *a linear member having a first attachment portion and a second attachment portion spaced apart from the first attachment portion*.

Luarent, and Kondo fail to cure these deficiencies. First, both references are directed to cartridge for use on printers, not for installation on planarizing machines. Second these references both disclose end-plates, not an elongated member or linear members disposed *between* the take up and supply rolls. Third, none of these references disclose *the take-up roll being movable relative to the supply roll to separate the first and second apertures by a second distance*. Tiez, while directed to CMP machines, also fails to disclose the foregoing elements. Accordingly, even if these references were analogous art (which they are not for the reasons discussed below) these references fail to disclose all the elements of Applicant's invention.

Second, of the cited references, Laurent and Kondo certainly are not analogous art. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of Applicant's endeavor, or if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oettker* 177 F.2d 1493, 1446 (Fed. Cir 1992). Laurent and Kondo are neither. These references are in the field of printer ribbons whereas Applicants' disclosure is in the field of devices for chemical mechanical planarization of semiconductor substrates.

These references are also not reasonably pertinent to Applicants' problem. "A reference is reasonably pertinent if, even though it may be in a different field from that of the

inventor's endeavor, if it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." In re Clay, 966 F.2d 656, 659 (Fed. Cir. 1992). The matter with which Laurent and Kondo deal with concerns relatively small cartridge assemblies for use in printers. Such cartridge assemblies have ribbons that are on rolls, and which are impacted by a print head or other device once per section of use. In contrast, the type of tolerance required for CMP machines is very great, CMP polishing pads require continuous and preferably adjustable tension of the pad across a platen, CMP machines use very large polishing pads made of dense material such as polyurethane, and CMP machines have the problem of continuous rotation of a substrate across the polishing pad which repeatedly uses the same section of material as the substrate orbits and the polishing pad is slowly advanced, as opposed to the single shot use of printer ribbons. The requirements of printer ribbons and CMP polishing machines are so fundamentally different that one of ordinary skill in the art would not logically look to ribbons for printer heads as a source of guidance in solving the inventor's problem in CMP machines.

Accordingly, Applicant request withdrawal of all the rejections of the claims as obvious over Ohno, Laurent, Kondo and/or Tiez.

Rejections over under § 112, first paragraph

Applicant traverses the Examiner's rejection of claims 35-43 as failing to comply with the written description requirement with respect to the expression, "a cartridge frame comprising a linear member". The recited items terms are clearly set forth in the text and/or figures of the specification. Page 45, line 17 refers to a cartridge frame 472 that maintains the separation distance between the supply roll and the take up roll. Figure 7 clearly illustrates the cartridge frame as being linear member. Moreover, the original claims filed with application, which form part of the specification, recite these terms.

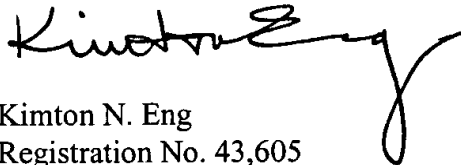
It is well established that drawings alone, even without the textual part of the specification, are sufficient to support the elements depicted in the drawings, *see, Vas-Cath v. Mahurkar*, 935 F.2d at 1565, 19 USPQ2d at 1118 ('...drawings alone may provide a "written description" of an invention as required by sect. 112. '); *see also, In re Wolfensperger*, 302 F.2d 950, 133 USPQ 537 (CCPA 1962) ('...the drawings of applicant's specification provided sufficient written descriptive support for the claim limitation at issue. '); *see further, Autogiro Co. of America v. United States*, 384 F.2d 391, 398, 155 USPQ 697, 703 (Ct. Cl. 1967)('In those

instances where a visual representation can flesh out words, drawings may be used in the same manner and with the same limitations as the specification.'). The Examiner's rejection for lack of written support overlooks both the textual reference mentioned above and the clear support provided by the drawings. Therefore, withdrawal of the rejection under § 112, first paragraph, is respectfully requested.

All of the claims remaining in the application are now clearly allowable.  
Favorable consideration and a Notice of Allowance are earnestly solicited.



Respectfully submitted,  
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